

AMENDMENT

IN THE CLAIMS:

1. (CURRENTLY AMENDED) A process for the production and purification of lactide, wherein, starting from an aqueous solution of lactic acid or lactic acid derivatives, the stages comprise:

- a) evaporation of free water and a portion of the water of constitution until oligomers having a molecular mass of between 400 and 2000 amu, a total acidity as lactic acid equivalent of between 119 and 124.5% and an optical purity, expressed as L-lactic acid, of between 90 and 100% are obtained;
- b) feeding a mixture comprising a depolymerization catalyst and the oligomers obtained in step a) to a depolymerization reactor to produce:
 - b1) a lactide-rich vapor phase, and
 - b2) an oligomer-rich liquid residue;
- c) selective condensation of the lactide-rich vapor with recovery, in the liquid form, of a crude lactide product freed from the volatile compounds;
- d) melt crystallization of the crude lactide product to produce:
 - d1) a purified lactide fraction having a residual acidity of less than 10 meq/kg, a water content of less than 200 ppm, a total lactide content of 99-99.9% and a meso-lactide content of less than 1%; and
 - d2) at least a first residual fraction having a lactide content comprised between 35 and 80%; and
- e) aqueous treatment of ~~the said at least first residual fractions~~ fraction from the step d2) of melt crystallization, consisting of:
 - e1) extractive and controlled crystallization of the residue fractions in an aqueous medium, with control of the geometry of crystals formed and with segregation of a lactide suspension towards a solid phase and of impurities towards a liquid phase to carry out aqueous extraction of the impurities;
 - e2) separation of the suspension of crystals formed in step e1) from the liquid phase and then draining to separate a wet cake rich in lactide crystals from a liquid phase depleted in lactide and laden with impurities; and

- e3) drying the wet cake to provide prepurified lactide obtained from said at least first residual fraction of said step d2).

2. (CANCELLED)

3. (CURRENTLY AMENDED) A process for the production of polylactide, wherein the stages of production and of purification of lactide, starting from an aqueous solution of lactic acid or lactic acid derivatives, comprise:

- a) evaporation of free water and a portion of the water of constitution until oligomers having a molecular mass of between 400 and 2000 amu, a total acidity as lactic acid equivalent of between 119 and 124.5% and an optical purity, expressed as L-lactic acid, of between 90 and 100% are obtained;
- b) feeding a mixture comprising a depolymerization catalyst and the oligomers obtained in step a) to a depolymerization reactor to produce:
 - b1) a lactide-rich vapor phase, and
 - b2) an oligomer-rich liquid residue;
- c) selective condensation of the lactide-rich vapor with recovery, in a liquid form, of a crude lactide product freed from volatile compounds;
- d) melt crystallization of the crude lactide product formed in step c) to produce:
 - d1) a purified lactide fraction having a residual acidity of less than 10 meq/kg, a water content of less than 200 ppm and a meso-lactide content of less than 1%; and
 - d2) at least a first residual fraction having a lactide content comprised between 35 and 80%; and
- e) aqueous treatment of ~~the said at least first residual fractions~~ fraction from the step d2) of melt crystallization, consisting of:
 - e1) extractive and controlled crystallization of the residual fractions in an aqueous medium, with control of the geometry of crystals formed and with segregation of a lactide suspension towards a solid phase and of impurities towards a liquid phase to carry out aqueous extraction of the impurities;

- e2) separation of the suspension of crystals formed in step e1) from the liquid phase and then draining to separate a wet cake rich in lactide crystals from a liquid phase depleted in lactide and laden with impurities; and
- e3) drying the wet cake to provide prepurified lactide obtained from said at least one first residual fraction of said step d2);
- f) polymerization of the purified lactide fraction obtained in said step d1) to polylactide.

4. (CANCELLED)

5. (PREVIOUSLY PRESENTED) The process according to claim 1, wherein the lactic acid derivatives comprise lactic acid esters.

6. (PREVIOUSLY PRESENTED) The process according to claim 1, wherein the lactic acid derivatives comprise a mixture of lactic acid and one or more lactic acid esters.

7. (PREVIOUSLY PRESENTED) The process according to claim 1, wherein the crude lactide product is enriched in prepurified lactide fractions originating from the aqueous treatment of the residual fractions from the step of melt crystallization.

8. (PREVIOUSLY PRESENTED) The process according to claim 1, wherein the prepurified lactide resulting from the aqueous treatment can be recycled at any point during the production and purification of lactide.

9. (PREVIOUSLY PRESENTED) The process according to claim 1, wherein a content of D-lactide during the process is controlled by polymerization by ring opening of the prepurified lactide.

10. (CURRENTLY AMENDED) The process according to claim 1, wherein the prepurified lactide obtained from the aqueous treatment e) of the residual fractions d2) exhibits a residual water content of between 50 and 1000 ppm, a total lactide content of between 70 and 99%, a

content of lactic acid and lactic acid oligomers of between 0 and 5% and a meso-lactide content of between 0 and 15%.

11. (PREVIOUSLY PRESENTED) The process for the production of polylactide according to Claim 3, wherein the polymerization of at least one of the purified lactide and the prepurified lactide comprises the steps of:

- a) addition of a catalyst or a mixture of catalysts to the lactide to form a mixture;
- b) initiation of the prepolymerization with addition to the mixture formed in step a) of optional comonomers, oligomers, prepolymers, stabilizers, fillers, reinforcing agents or polymerization moderators; and
- c) polymerization in an extruder with addition of optional comonomers, oligomers, prepolymers, stabilizers, fillers, reinforcing agents or polymerization moderators.

12. (PREVIOUSLY PRESENTED) The process for the production of polylactide according to Claim 3, wherein the polymerization of at least one of the purified lactide and the prepurified lactide comprises the steps of:

- a) addition of a catalyst or a mixture of catalysts to the lactide to form a mixture;
- b) polymerization in an extruder with addition to the mixture formed in step a) of optional comonomers, oligomers, prepolymers, stabilizers, fillers, reinforcing agents or polymerization moderators.

13. (PREVIOUSLY PRESENTED) The process for the production of polylactide according to Claim 3, wherein, during the purification and the production of polylactide, the recycled fractions of lactic acid or the lactic acid derivatives are introduced in the purification stage of the process for the production of lactic acid or the lactic acid derivatives.

14. (PREVIOUSLY PRESENTED) The process for the production of lactide according to Claim 1, wherein, during the production and the purification of lactide, the recycled fractions of lactic acid or the lactic acid derivatives are introduced in the purification stage of the process for the production of lactic acid or the lactic acid derivatives.

15-20. (CANCELLED)

21. (PREVIOUSLY PRESENTED) The process according to claim 3, wherein the lactic acid derivatives comprise lactic acid esters.

22. (PREVIOUSLY PRESENTED) The process according to claim 3, wherein the lactic acid derivatives comprise a mixture of lactic acid and one or more lactic acid esters.

23. (PREVIOUSLY PRESENTED) The process according to claim 3, wherein the crude lactide product is enriched in prepurified lactide fractions originating from the aqueous treatment of the residual fractions from the step of melt crystallization.

24. (PREVIOUSLY PRESENTED) The process according to claim 3, wherein the prepurified lactide resulting from the aqueous treatment can be recycled at any point during the production and purification of lactide.

25. (PREVIOUSLY PRESENTED) The process according to claim 3, wherein a content of D-lactide during the process is controlled by polymerization by ring opening of the prepurified lactide.

26. (CURRENTLY AMENDED) The process according to claim 3, wherein the prepurified lactide obtained from the aqueous treatment e) of the residual fractions d2) exhibits a residual water content of between 50 and 1000 ppm, a total lactide content of between 70 and 99%, a content of lactic acid and lactic acid oligomers of between 0 and 5% and a meso-lactide content of between 0 and 15%.

27-35. (CANCELLED)

36. (PREVIOUSLY PRESENTED) The process for the production of polylactide according to Claim 11, wherein, during the purification and the production of polylactide, the recycled

fractions of lactic acid or the lactic acid derivatives are introduced in the purification stage of the process for the production of lactic acid or the lactic acid derivatives.

37. (PREVIOUSLY PRESENTED) The process for the production of polylactide according to Claim 12, wherein, during the purification and the production of polylactide, the recycled fractions of lactic acid or the lactic acid derivatives are introduced in the purification stage of the process for the production of lactic acid or the lactic acid derivatives.

38. (CANCELLED)

39. (PREVIOUSLY PRESENTED) The process according to Claim 5, wherein the crude lactide product is enriched in prepurified lactide fractions originating from the aqueous treatment of the residual fractions from the step of melt crystallization.

40. (PREVIOUSLY PRESENTED) The process according to Claim 6, wherein the crude lactide product is enriched in prepurified lactide fractions originating from the aqueous treatment of the residual fractions from the step of melt crystallization.

41. (PREVIOUSLY PRESENTED) The process according to Claim 5, wherein the prepurified lactide resulting from the aqueous treatment can be recycled at any point during the production and purification of lactide.

42. (PREVIOUSLY PRESENTED) The process according to Claim 6, wherein the prepurified lactide resulting from the aqueous treatment can be recycled at any point during the production and purification of lactide.

43. (PREVIOUSLY PRESENTED) The process according to Claim 7, wherein the prepurified lactide resulting from the aqueous treatment can be recycled at any point during the production and purification of lactide.

44. (PREVIOUSLY PRESENTED) The process according to Claim 5, wherein a content of D-lactide during the process is controlled by polymerization by ring opening of the prepurified lactide.

45. (PREVIOUSLY PRESENTED) The process according to Claim 6, wherein a content of D-lactide during the process is controlled by polymerization by ring opening of the prepurified lactide.

46. (PREVIOUSLY PRESENTED) The process according to Claim 7, wherein a content of D-lactide during the process is controlled by polymerization by ring opening of the prepurified lactide.

47. (PREVIOUSLY PRESENTED) The process according to Claim 8, wherein a content of D-lactide during the process is controlled by polymerization by ring opening of the prepurified lactide.

48. (CURRENTLY AMENDED) The process according to Claim 5, wherein the prepurified lactide obtained from the aqueous treatment e) of the residual fractions d2) exhibits a residual water content of between 50 and 1000 ppm, a total lactide content of between 70 and 99%, a content of lactic acid and lactic acid oligomers of between 0 and 5% and a meso-lactide content of between 0 and 15%.

49. (CURRENTLY AMENDED) The process according to Claim 6, wherein the prepurified lactide obtained from the aqueous treatment e) of the residual fractions d2) exhibits a residual water content of between 50 and 1000 ppm, a total lactide content of between 70 and 99%, a content of lactic acid and lactic acid oligomers of between 0 and 5% and a meso-lactide content of between 0 and 15%.

50. (CURRENTLY AMENDED) The process according to Claim 7, wherein the prepurified lactide obtained from the aqueous treatment e) of the residual fractions d2) exhibits a residual water content of between 50 and 1000 ppm, a total lactide content of between 70 and 99%, a

content of lactic acid and lactic acid oligomers of between 0 and 5% and a meso-lactide content of between 0 and 15%.

51. (CURRENTLY AMENDED) The process according to Claim 8, wherein the prepurified lactide obtained from the aqueous treatment e) of the residual fractions d2) exhibits a residual water content of between 50 and 1000 ppm, a total lactide content of between 70 and 99%, a content of lactic acid and lactic acid oligomers of between 0 and 5% and a meso-lactide content of between 0 and 15%.

52. (CURRENTLY AMENDED) The process according to Claim 9, wherein the prepurified lactide obtained from the aqueous treatment e) of the residual fractions d2) exhibits a residual water content of between 50 and 1000 ppm, a total lactide content of between 70 and 99%, a content of lactic acid and lactic acid oligomers of between 0 and 5% and a meso-lactide content of between 0 and 15%.